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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAMES E. SIMPSON,
HECTOR M. RODRIGUEZ,
MARK E. VERMILYEA,
MARIA M. OTERO, AND
BRIAN D. LOUNSBERRY

Appeal 2008-2379
Application 10/813,365
Technology Center 2800

Decided: June 27, 2008

Before EDWARD C. KIMLIN, BRADLEY R. GARRIS, and KAREN M.
HASTINGS, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1, 2, 4-8, 10-17,
and 19-21. Claims 1, 14, and 19 are illustrative:

1. An X-ray tube, comprising:

an anode assembly, comprising:

a target for emitting X-rays upon irradiation with an electron beam,

a rotor shaft coupled to a motor rotor system and the target, the rotor shaft configured to rotate the target, and

a bearing system comprising at least two duplex bearing assemblies supporting the rotor shaft; and

a cathode assembly, comprising:

a cathode configured to emit the electron beam, and

an insulator isolating the cathode from ground potential, wherein the insulator and the motor rotor system are located on the same side of the target.

14. An anode assembly, comprising:

a target for emitting X-rays upon irradiation with an electron beam;

a rotor shaft coupled to a motor rotor system and the target, the rotor shaft configured to rotate the target; and

a bearing system comprising at least two duplex bearing assemblies supporting the rotor shaft, wherein the at least two duplex bearing assemblies straddle the target.

19. A method for CT imaging, the method comprising:

rotating a gantry about a subject at greater than three rotations per second;

emitting X-rays from an X-ray tube mounted on the gantry; and

generating one or more images of the subject based upon the attenuation of the emitted X-rays by the subject.

The Examiner relies upon the following references as evidence of obviousness:

Carlson ('340)

4,577,340

Mar. 18, 1986

Carlson ('447)	5,978,447	Nov. 2, 1999
McCarthy	US 2004/0109538 A1	Jun. 10, 2004
Chidester	6,819,741 B2	Nov. 16, 2004

Appellants' claimed invention is directed to an X-ray tube and CT system comprising the X-ray tube wherein the tube comprises, inter alia, an anode assembly comprising two duplex bearing assemblies supporting a rotor shaft, and a cathode assembly comprising an insulator which isolates the cathode from ground potential.

Appealed claims 1, 2, 4-8, and 10-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Carlson '447 in view of Chidester and Carlson '340. Claims 19-21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over McCarthy.

For the § 103 rejection over the combined teachings of Carlson '447, Chidester, and Carlson '340, Appellants present separate arguments only for claims 1 and 14. Accordingly, claims 1, 2, 4-8, 10-13, and 15-17 stand or fall together. Also, for the § 103 rejection of claims 19-21 over McCarthy, claims 20 and 21 stand or fall together with claim 19.

We have thoroughly reviewed each of Appellants' arguments for patentability. However, we are in full agreement with the Examiner that the claimed subject matter would have been obvious to one with ordinary skill in the art within the meaning of § 103 in view of the applied prior art. Accordingly, we will sustain the Examiner's rejections for the reasons set forth in the Answer, which we incorporate herein, and we add the following for emphasis only.

We consider first the Examiner's rejection of claims 1-2, 4-8, and 10-17 over Carlson '447 in view of Chidester and Carlson '340. Appellants do not

dispute the Examiner's factual determination that Carlson '447 discloses a CT system comprising an X-ray tube having the claimed features with the exception of duplex bearings and an insulator which isolates the cathode from ground potential. However, we are in full agreement with the Examiner that Chidester evidences the obviousness of providing an insulator for the cathode of Carlson '477, and Carlson '340 establishes the obviousness of employing two duplex bearings for an X-ray tube of the type disclosed by Carlson '477. We agree with the Examiner that one of ordinary skill in the art "would have recognized that an insulator must be utilized [in the X-ray tube of Carlson '447] otherwise the cathode would short to ground via the metal housing rendering the X-ray tube inoperable" (Ans. 8, first para.). We also agree with the Examiner that Carlson '340 demonstrates that it was known in the art to employ duplex bearings for supporting an X-ray target shaft. Accordingly, we find that it would have been obvious for one with ordinary skill in the art to utilize the duplex bearings of Carlson '340 as a viable alternative to the bearings of Carlson '447.

Appellants submit that the insulator and the motor rotor system are located on the same side of the target. However, the Examiner correctly points out that the claimed disposition for the cathode and motor rotor system on the same side of the target is taught by Carlson '447.

Appellants also emphasize that "the Carlson '447 reference specifically discloses an arrangement of a bearing assembly (68) that does not require additional electrical insulation with respect to the cathode assembly (55)," citing Carlson '447 at col. 9, ll. 65 et. seq. (Principal Br. 8, last para.). Appellants also maintain that the reference teaches the necessity for significant electrical insulation between the various tube components in the Background

section and, therefore, "describes part of the problem to be solved by the invention of the Carlson '447 reference" (Reply Br. 3, first para.). Appellants argue that Carlson '447 removes the need for insulation and, therefore, it would not have been obvious to provide the claimed insulator which isolates the cathode from ground potential.

However, we agree with the Examiner that Carlson '447 sets forth no such teaching that an insulator for the cathode is not necessary. Rather, the reference disclosure cited by Appellants teaches only that since neither of the bearings (90a) nor (90b) are directly exposed to the electric field of the cathode, no **additional** insulation is necessary. Manifestly, the lack of a need for additional insulation for bearing (90a) and (90b) is hardly tantamount to a teaching that no insulation is needed or desirable for insulating the cathode from ground potential. Moreover, we are satisfied that it would have been obvious for one with ordinary skill in the art to provide additional insulation for an X-ray tube of the type disclosed by Carlson '447 in the interest of safety. Although a particular apparatus may not **require** additional insulation, we find nothing unobvious in providing added insulation as an exercise of caution.

Concerning the duplex bearing assemblies of Carlson '340, Appellants make the argument that the duplex bearings of the reference do not straddle the target. However, independent claims 1 and 7 do not require that the duplex bearing assemblies straddle the target; claim 14 is the only independent claim on appeal having this recitation. Also, as explained by the Examiner, Carlson '447 teaches tube bearing assemblies straddling a target, and Carlson '340 evidences the obviousness of utilizing duplex bearings for straddling the target of Carlson '447. We note Appellants' contention that the Examiner describes only the advantages of using duplex bearings but not the disincentives, such as

"increased complexity, size constraints associated with a second bearing assembly, and increased failure rate due to an increase, i.e., a doubling, in the number of bearings which can fail, and thereby, require replacement of the entire bearing assembly or X-ray tube itself" (Reply Br. 4, second para.). However, Appellants have not explained why it would not have been obvious for one with ordinary skill in the art to weigh the advantages and disadvantages of employing such duplex bearings in a system of the type disclosed by Carlson '447. It is well settled that it is a matter of obviousness for one of ordinary skill in the art to balance the recognized advantages and disadvantages of a known apparatus or device. Certainly, it would seem that the disincentives mentioned by Appellants are also associated with the claimed system.

We now turn to the § 103 rejection of claims 19-21 over McCarthy. Claim 19 defines a method for CT imaging wherein a gantry is rotated about a subject at greater than 3 rotations per second. Appellants' only argued distinction over the method disclosed by McCarthy is that McCarthy teaches the gantry rotating about 2-3 revolutions per second. We are in full agreement with the Examiner, however, that McCarthy's teaching of about 3 revolutions per second (col. 2, para., 0027) would have rendered obvious the claimed value of greater than 3 revolutions per second. Significantly, Appellants agree with the Examiner that the scope of claims 19 and 21 includes rotations at 3.00000001 revolutions per second (Reply Br. 5, first full sentence). Consequently, we have no doubt that one of ordinary skill in the art would have understood that McCarthy's teaching of about 3 revolutions per second includes revolutions slightly greater than 3 per second. While Appellants contend that "there is no indication that the gantry disclosed by the McCarthy reference is physically capable of rotating at velocities higher than those disclosed" (Reply Br. 6, last

sentence), we, unlike Appellants, find that it is reasonable to conclude that the gantry of McCarthy is capable of rotating at velocities slightly greater than the about 3 rotations per second disclosed. Appellants have advanced no evidence or reason to support the speculation that the system of McCarthy is incapable of such rotations, nor have Appellants explained why it would not have been obvious for one with ordinary skill in the art to modify the system of McCarthy if, in fact, it is only capable of rotating the gantry at 3 rotations per second.

As a final point, we note that Appellants base no argument upon objective evidence of nonobviousness, such as unexpected results, which would serve to rebut the inference of obviousness established by the applied prior art.

In conclusion, based on the foregoing and the reasons well stated by the Examiner, the Examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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